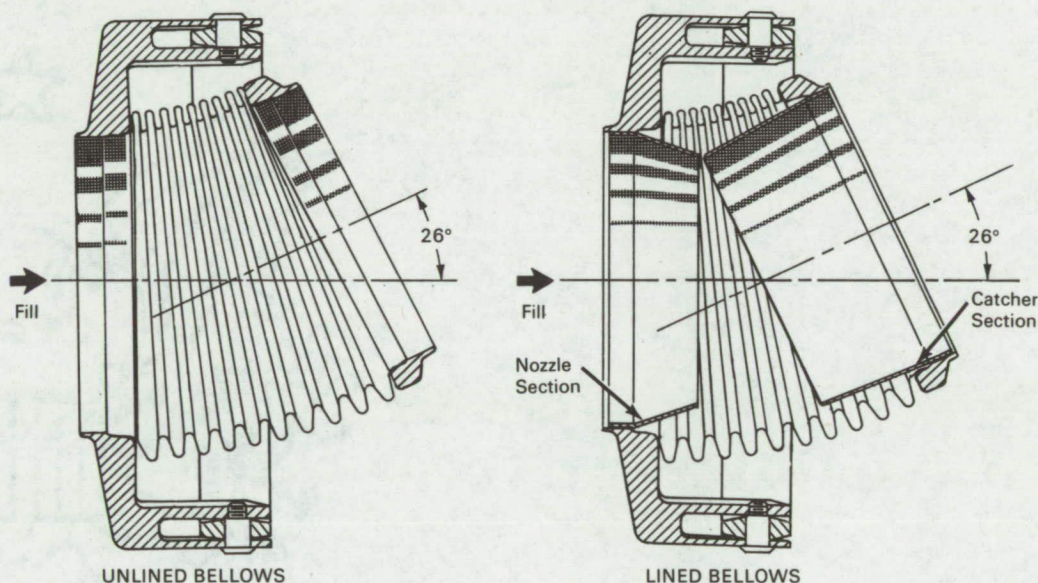


NASA TECH BRIEF



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Flow Liner Extends Operating Life of High-Angulation Bellows



The problem:

To extend the service life of externally gimbaled high-angulation (26-degree) bellows used as ducts for high-velocity fluid flow in a liquid oxygen fill and drain system. Conventional (unlined) bellows used in this system failed from fatigue after only a few hours of service testing. The failures were determined to be the result of flow-induced vibration of the bellows. A full-length conical liner, such as used in established practice for protecting the interior of bellows, was not acceptable for the 26-degree bellows because too large a reduction in flow area would be required.

The solution:

A bellows liner consisting of two sections: (1) a conical frustum or nozzle on the upstream side and

(2) a cylindrical section or catcher on the downstream side. The liner directs a jet from the nozzle across the open gap to the catcher on the other side of the bellows. This configuration directs the vibration-inducing flow away from the bellows convolutions, while allowing full gimbal motion and a relatively small reduction in flow area.

Note:

Inquiries concerning this development may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10512

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: D. G. Rumph
of The Boeing Company
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